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THE
GENERAL PRINCIPLES OF MEDICAL
CLIMATOLOGY

AND THEIR APPLICATION TO THE
CLIMATES OF THE SOUTH-EAST AND
SOUTH-WEST OF FRANCE

BY
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KNIGHT OF THE IMPERIAL GERMAN ORDER OF THE ROYAL CROWN, THIRD CLASS; CROSS AND
RIBBON D'ESPÂNA AGRADECIDA; CROSS AND RIBBON OF THE INTERNATIONAL SOCIETY
FOR WOUNDED IN WAR; SENIOR ENGLISH RESIDENT PHYSICIAN AT FAU

TRANSLATED FROM THE FRENCH, PRINTED IN THE 'TRANSACTIONS OF THE
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P R E F A C E

THE “Commission Syndicale de Pau,” elected by the votes of their townsmen and legalised by the decree of the Préfet des Basses Pyrénées, has for its principal mission to assist strangers who arrive in Pau for a season to get comfortably installed in apartments, and to act as arbiters in any misunderstanding with landlords, purveyors, and servants. They consequently keep registers of apartments to be let ; and much trouble, irritation, and responsibility are saved by their intervention as a salutary break-water between parties whose interests are not always identical. The services of the “Commission Syndicale ” and of their staff are gratuitous.

Another part of the Syndicate’s mission is to publish, from time to time, such information with regard to Pau and its climate as may tend to make the truth prevail with regard to those matters, and to undo misrepresentations which interested competition is in the habit of diffusing.

With this object, and with the permission of Sir Alexander Taylor, M.D., the Commission Syndicale now present a translation of a memoir—written by him and read before the Scientific Congress of France in 1873, and ordered to be printed in its ‘Transactions’—on “Man : the General Principles Medical Climatology, and their Application to the

Climates of the South-east and South-west of France," which will be found to contain much information treated with impartiality.

The importance which Pau has attained to as a place of health resort may be judged by a few statistical facts.

The population in 1838 was 12,000 ; at the present day it is above 30,000, and when we mention that throughout the whole of France population only doubles itself in 200 years, it will be seen that in thirty-eight years the tardy work of 300 years has been accomplished in the growth of the population there.

There was no English place of worship ; now there are four churches ; and as for amusements, there are fox-hounds three times a week, club-house, opera, theatre, all English games naturalised, and pleasure for young and old in abundance. The sum expended by strangers during the winter season is calculated at £600,000 and upwards.

The first object of the Commission Syndicale being to be of service to intending visitors, they will always be most happy to give gratuitously and impartially any desired information, either in answer to letters or on personal application.

The Offices of the Commission Syndicale are situated 7, Rue des Cordeliers, under the direction of Mons. le Baron de Brauncker Beridez, who reads, writes, and speaks many languages.

PAU ;

1st Sept., 1875.

THE
GENERAL PRINCIPLES OF MEDICAL
CLIMATOLOGY

IN 1873 the Scientific Congress of France, resembling in its organisation the Social Science Meetings in England, held its 39th annual meeting at Pau, now become a *centre* of importance. The Congress did the author of this memoir the honour to elect him a Vice-President of the Anthropological Section and to give him the subject to write upon which heads this paper. On its being read the memoir was voted to be printed in the 'Transactions' of the Congress.

The first part of the memoir was devoted to Man and to Theories as to his Origin. Of this discussion it is not considered necessary even to give a *résumé* here, as it does not concern the object of the present publication; for it is with developed man, in a physiological sense, that we have to do, such as we find him at the present day, the result of religion, civilisation and *hygiène*, and subject to climateric influences on his moral and physical condition in health and disease.

When we regard the human race we find that the external agents which surround man, act in a different manner on different groups of the human family, and an attentive investigation of the causes of this difference leads us to attribute it to individual peculiarities.

In the application of sanitary rules it is useful and important to keep in view these peculiarities and differences. The conditions for the preservation of health are not the same for the inhabitants of the west as for the south of Europe. The variety of temperaments, of ages, of idiosyncrasies, of hereditary predispositions, of habits, of individual constitutions, ought always to be taken into account, and this rule extends also to the choice of climate as a means of preserving health or of remedying the derangements with which it may have been attacked.

The question as to whether the human races have been produced as the result of circumstances, or if they have been created with these innate peculiarities, is not yet a settled one; but it is evident that there are different human races on which external agents act differently.

The races which inhabit the centre and north of Europe cannot support the heat of a tropical climate with the same impunity as an inhabitant of Asia or Africa born and brought up under the Tropics; and southern races transported into temperate or cold regions require even clothing warmer than the natives themselves.

Physicians and physiologists have long acknow-

ledged three kinds of temperament, each distinct from the other, which have been designated by the names *nervous*, *sanguine*, and *lymphatic*; others add the bilious and melancholic temperaments. However this may be, there can be no doubt that the individuals who possess the characters of these diverse temperaments present different predispositions to disease. The circumstances which would easily produce certain forms of disorder in an individual class, would not produce any effect on another. Still more, the same cause would, in persons of a different temperament, produce diseases of a different kind.*

These temperaments may be thus described. The *sanguine* temperament has the following characteristics:—The hair red or fair; the eyes blue; the complexion ruddy; the arteries and veins developed and striking; the body generally robust, of great height, and has a disposition to corpulence at middle age.

The *phlegmatic* temperament is recognised by these signs:—Light chesnut hair; brown chesnut eyes; the skin pale and sickly in colour, and very often unfurnished with hair; small blood-vessels; feeble and slow pulse; chilliness of body, and in general a deficiency of energy in the functions of animal and physical life.

In the *choleric* temperament the hair of the head is black and curly, the complexion ruddy brown, the skin hairy, and the pulse strong and full.

In the *melancholic* temperament we find also the

* ‘Encyclopædia Britannica,’ art. “Sanitary Science.”

colour of the hair and eyes black; the complexion brown; but the hair is coarse; the skin livid and sickly; the pulse slow. It is remarkable that persons of this temperament are of high stature, with long necks, narrow shoulders, flat chests, long and small heads, flattened on the sides; with projecting foreheads, well-proportioned faces, fine features, and thin lips. These persons are slow and calm in their habits and manners.

We must add to these varieties of corporal constitution and external appearances certain peculiarities of mind, character, and disposition, which accompany each variety. The relations of moral and physical qualities with the organisation of the body constitute an essential part of the theory of temperament.

In taking the classification of temperaments as we have described it, without seeking to extend or modify it, we shall find that these four varieties of external character really indicate more or less constantly the differences of constitution, and consequently of morbid predisposition. There can be no doubt that persons who have, more or less, a sanguine temperament are more liable to certain derangements of body than the phlegmatic and melancholic, while these, again, have their distinct and particular predispositions.

The *sanguine* have a vascular constitution fully developed, and consequently a vigorous circulation of the blood, a warm skin, and are endowed with a high degree of organic sensibility. They are more liable to quick and sudden impressions than those whose vital

functions languish. They are exposed to inflammatory maladies, and those of a kind much more acute. They bear much better than delicate persons blood-letting, which was regarded *formerly* as the most appropriate treatment in this class of affections. One sees also that persons of sanguine temperament are more subject to hæmorrhages, at least to those which proceed from an excessive force of the circulation of the blood through the arteries.

Persons of a *phlegmatic* temperament are predisposed to maladies which depend more or less on a weakened condition of the vital energy. Local congestions, independently of all general excitement, are frequent in this category of temperaments. Glandular and tuberculous affections attack the body when the organisation is feeble, and consequently are more frequent among phlegmatic than among persons of another temperament. Inflammatory diseases, when they attack phlegmatics, are less acute and become more frequently chronic than in those of sanguine temperament.

The connection observed between the choleric and sanguine temperaments exists also between the phlegmatic and melancholic. The two first display a much greater energy in health and in disease. The choleric and the sanguine connected with derangements of the nervous system are affected acutely; raving madness is often found among persons of this constitution.

The melancholic temperament is more disposed to monomania, accompanied with sad and morose views. Hypochondria principally attacks

the phlegmatic and melancholic. We meet with the most grave instances of hypochondria among persons of a wan complexion, fixed look, sad, stiff, dark aspect. The connection of moral peculiarity with the physical structure of man has been often observed by authors of every age. According to Hoffman,* the choleric temperament, as a consequence of organisation, disposes man to violence in his conduct—anger, audacity, impatience, rashness, quarrels, seditions, and such like; while, on the other hand, the slow circulation of the blood renders the melancholic timid, inactive in business, desponding, suspicious, and slow to form or to express an opinion. The sanguine, thanks to a happier temperament, is gay and free from care; an oppressive serosity subjects the phlegmatic to indolence, somnolence, torpor.

Certain temperaments fit men for different social positions in life. The phlegmatic, says Hoffman, are fitted to be counsellors and ministers of state; persons of sanguine temperament to be courtiers. As to individuals who have the misfortune to belong to the melancholic temperament, they are altogether unsuitable to elevated positions in society; they are only good for the most humble employments, such as soldiers or labourers.

It is very probable that an opinion, based on the experience of so many centuries and of so many specialists, on a subject not demanding abstract investigation, ought to have some standing ground. The doctrine of temperament is true up to a certain

* Hoffman, 'De Temperamento, Fundamento Malorum.'

point, and has always been confirmed by experience. To be convinced of this, let individuals of a highly sanguine temperament be compared with those who give evident signs of a melancholic temperament. There can be no doubt that among the first many are found of an amiable and gay disposition, a great sensibility, and a tendency to passions, but not to violent ones. Among the latter, on the contrary, we find instances of persons who, if they are not sad and dejected, are, nevertheless, calm, serious, and passive, rather than gay and joyful, but, at the same time, tenacious of impressions once graven on their minds and capable of a strong and unbroken attention.

These characteristic differences may be attributed more or less to a certain degree of sensibility, or to a greater or less excitement of the nervous system. This depends, perhaps, in the first instance, on the circulation of the blood, of which the apparatus is more developed in the sanguine than in the melancholic. There is no fact better established in physiology than the intimate relation existing between organic sensibility and the free circulation of the blood, the increase or decrease of sensibility, which results on one side from heat and muscular action, and on the other from cold, torpor, and the retreat of the blood from the surface of the body and from the organs of sense. The state of the mind sympathises much with affections of the body; and it is impossible for any thinking person, who considers these and other analogous facts, to doubt that different moral qualities have an intimate relation

to each temperament, and that in case of derangement of health the symptoms show the character and force of the predisposition of each person subject to such derangement.*

We have entered into these developments on the subject of temperaments because they will serve as a guide when we come to inquire into the properties of different climates, and have to recommend their application to those in search of health, on the logical basis of temperament. We shall find, in fact, that the qualities of climates, prescribed in a curative sense, ought to be in strict relation to the natural temperament of the patient; for the diseases, for instance, of an individual of a sanguine or a choleric temperament, whose vascular action and nervous excitation play such an exaggerated part in health and disease, would exact a medical regimen and atmospheric circumstances totally different from those of the phlegmatic and melancholic temperaments.

And it appears to us, after having practically studied this question for more than thirty years, and collected and collated evidence on the spot, as to the *test* which ought principally to guide the physician in the choice of climates for the sick, we, with some confidence, say that the natural temperament of the individual in health ought to be that test; for the diseases which occur in any given temperament have a running accompaniment of the principles of the original organisation always present, marking their origin and character.

* ‘Encyclopædia of Practical Medicine,’ art. “Temperament.”

And here, *en passant* and in general support of this proposition, we suggest some abstract principles which may enlighten and guide the inquirer. It is necessary to explain here that, by the terms of the programme of the Scientific Congress of France, we are narrowed to the task of making the application of the general principles of climatology hereafter to be brought forward to the climates of the south-east and south-west of France. When in the sequel we shall have to treat of those climates in detail, we shall find that those zones, though in the same latitude, differ *toto cælo* the one from the other relatively to their effects on the human constitution in health and disease.

For instance, the climates of the south-east and south-west of France may be divided into two classes, those which are *exciting* and those which are *sedative*. In the exciting climates one invariably finds the following atmospheric conditions:—Excess of dryness, highly electric state of the air, the presence of ozone, and, during the spring, piercing and irritating winds, as at Nice, Menton, Cannes, Hyères, Montpellier, &c. In sedative climates we find almost a neutral state of the atmosphere, a remarkable freedom from over-dryness on the one hand and from communicable damp on the other, small proportion of free electricity and ozone, and great atmospheric stillness, as at Pau. In the region of the south-west on the shores of the Bay of Biscay, seventy miles from Pau, there is Biarritz, a place which in the recollection of the author has risen from the rank of an insignificant fishing hamlet,

with wretched houses sprinkled about on sand-hills, to be the Brighton of Pau, where there is now everything which can make life pleasant in the shape of the purest and health-restoring air, and with the adjuncts of first-class hotels, a well-organised club, an English church, and a good English physician.

Biarritz, although in the south-west zone of France, from its being on the sea, partakes much of the properties of the climates of the south-east, and its climate is consequently exciting, like theirs, from the presence of free electricity and ozone in abundance; but the spring winds being very often westerly, and, with their variations, softened by passing over a temperature of sea higher than that of the land, have not the same irritating sharpness as those of the south-east, the Gulf Stream even exerting an influence to this effect; indeed, in the months of March and April the fashionables of Pau, after a fatiguing winter campaign of dancing, dining, and hunting, repair to Biarritz to have their nervous system re-strung.

It is pleasant to think that there cannot, at least ought never to be, any jealousy betwixt Pau and Biarritz, differing as they do in climate. A strict confederation ought to exist, based on scientific reasons and cemented by self-interest. The one will then come to be a feeder to the other. Biarritz will gradually take the place of some of the south-eastern stations, and we shall have the south-western zone of France a sanatorium for Europe. How often, from misdirection, do patients come to Pau who

ought to have been sent to Nice, Cannes, and other exciting climates. The distance, the fatigue, the expense, act as a *force majeure* to keep these where they are. When the climate of Biarritz shall have undergone a longer probation, three and a half hours of railroad will give the patients all the change of climate necessary for them, and a safe and salutary winter and spring home.

The physician who has to decide for a patient for whom a change of climate is considered necessary can have no difficulty in deciding to which of the climates he ought to proceed. Is it his object to stimulate functional languor, to quicken a slow circulation, to rouse up dormant energy? he would not recommend persons so circumstanced—in other words, the phlegmatic and melancholic invalid—to proceed to sedative climates such as Pau, Pisa, or Rome.

Is it the intention to calm nervous and vascular excitement, to lessen inflammatory tendencies, and to assist in producing functional repose? the medical adviser would not send these diseased choleric and sanguine temperaments to exciting climates such as Nice, Menton, Cannes, Hyères, Montpellier, and Biarritz.

Let us now discuss the question of general climatology, in order to eliminate some principles applicable to man in health and disease.

“The term climate, taken in its most general sense, indicates all the changes in the atmosphere which sensibly affect our organs, as temperature, humidity, variations in the barometric pressure, the

calm state of the air, the action of opposite winds, the amount of electric tension, the purity of the atmosphere or its admixture with more or less gaseous exhalations, and, finally, the degree of ordinary transparency and clearness of the sky, which is not only important with respect to the increased radiation from the earth, the organic development of plants, and the ripening of fruits, but also with reference to its influence on the feelings and mental condition of man.”*

The diversity of the characters of climate is in general attributed to a combination of distinct and numerous causes, which may, however, be reduced into two—the distance from the equator and the height above the level of the sea. Latitude and local elevations of the land have also been considered as forming causes of climate ; but the circumstances which modify this arbitrary rule ought not to be neglected in the appreciation of the differences of climate.

For instance, about two thirds of the surface of the globe is covered with water. It is evident that the proportion of land and sea on every part of the terrestrial surface must singularly modify the temperature of such and such a region. The radiation of heat from rough and from polished surfaces, under a cloudless sky, is different. The opaque and rude surface of the land loses more rapidly its temperature by radiation than does the surface of the sea. The portion of sea covered by ice and snow, relatively less than that of the earth, produces a difference of

* Humboldt's 'Cosmos,' vol. i.

temperature in countries placed under the same latitude.*

We find many anomalies connected with climate, independently of its degree of latitude, which influence its temperature and degree of humidity, such as the shape of the countries in which the different districts may lie, the position of a hill favorably situated as a shield from the bad-weather quarter or the reverse, and other circumstances not readily observable as causes, but fully appreciable in their results. Thus Middleburg, which is a degree further south than Amsterdam, ought to have a mean higher temperature of 2° , whereas it is 4° lower. The town of Brussels has not its mean temperature so high as Amsterdam, although it is a degree and a half more to the south. Marseilles is more than a degree to the south of Genoa; the mean temperature of the latter, then, ought to be one degree less than the former, but it is, on the contrary, two degrees higher. It would not be surprising that Marseilles should have a climate warmer than Avignon, which is situated more to the north and in the interior, and that the winters should be here less cold and the summers less hot; but what is the cause which renders the mean temperature of Marseilles lower than that of Avignon? Rome and Perpignan have exactly the same mean temperature, although Rome is a degree more to the south. It may be given as a reason that Rome is influenced by the Apennines, but Perpignan is at the foot of the Pyrénées.*

It is not merely a climate possessing a high ther-

* 'Encyclopædia Britannica,' art. "Climate."

metre and barometric standard which can or does afford a panacea for all those diseases for the relief of which people fly from cold and damp countries. The varieties of atmosphere are so different from local circumstances in different places in the same latitudes that an intimate knowledge of the peculiar details, as they operate beneficially or otherwise, is required in conjunction with general meteorological *data* to fix a rule as to the medical fitness of any climate ; and thus experience comes to the aid of philosophy.

For instance, we shall have a higher degree of temperature marked by the thermometer in one country, yet it shall feel colder to the sense and the body shall actually be robbed of more animal warmth than in another where the temperature is some degrees lower. The prevalence of certain winds blowing with unmodified force, and an excess of *free communicable humidity* in the air, far more than overbalance the benefits of a higher temperature in its effects upon the human frame, while certain electric states of the atmosphere add, at one time, fuel to diseases depending on mixed nervous and inflammatory irritation, and at another time very materially improve the type of maladies connected with weakly and ill-conditioned temperaments, and thus confound our usual reasonings from meteorological indications.

Thus at Nice, where during the spring months the temperature is $2\frac{1}{4}^{\circ}$ higher than at Pau, the healthy and unhealthy feel, to use their own expression, *cut in two*

* 'Annuaire du Bureau des Longitudes' for 1834.

by the Mistral which blows from the north-west, and still more from easterly winds which begin in March and continue to the end of April. This same state of weather is more or less injuriously felt in all the south-eastern stations bordering on the Mediterranean. At Rome, again, where the temperature is 3° higher than at Pau, the Tramontana blows with a severity almost equalling the Mistral, while at the same season in Pau the weather is mild and sedative from the almost total absence of wind and from other atmospheric circumstances peculiar to the climate, which will be, by-and-bye, meteorologically accounted for.

We may also observe that the quantity of rain indicated by the rain-gauge as having fallen in any one place does not necessarily determine the character of the climate as to humidity. This is remarkably the case with Pau, where the rain-gauge and the hygrometer are much at variance, not only absolutely in so far as Pau is concerned, but relatively to other places.

There are some circumstances, although familiar, which we shall give as illustrations of the peculiar absence of *free communicable damp* in the atmosphere at Pau. Although considerably more rain falls in Pau than in London, yet from the absorbent nature of the soil, and from some electric state of the atmosphere, ladies, even during a continuance of rainy weather, find that their hair, a living hygrometer highly sensitive to an overcharged state of the atmosphere, retains the curl much better than in England. Another familiar proof of the deficiency

of free moisture in the atmosphere may be given, viz., steel articles of furniture are rarely found affected with rust, even in unoccupied houses, nor do the walls show marks of damp. It may be remarked also that it is hardly ever necessary to air, by the fire, flannel articles of clothing or bed linen which may have been put aside in cupboards or otherwise until wanted. If once dry they remain so, and even residents in Pau have often observed that a saturated towel will, in a few hours, during rainy weather, in a room without a fire, become perfectly dry, while in the most favoured districts in England, in many parts of Italy, and even in the Azores, where the temperature is always more elevated than at Pau, flannel articles of dress, &c., become thoroughly damp from the *free* humidity with which the atmosphere in those places is impregnated.

The difference betwixt the earth and the sea in the reception and transmission of heat constitutes the difference between an insular and a continental climate. The sea is not so quickly heated by the summer's sun as the earth; thus the sea breeze is cooler in summer; and as the earth cools more quickly than the sea in winter, the air of the sea is warmer and tempers the rigour of the season. Compare, for instance, the mildness of the climate of the British Isles with the climate of Sweden and the north of Germany, in the same parallel, which is occasioned by the oceanic currents conveying to those shores the waters heated by the summer. We may here give the grand instance known as the *Gulf Stream*. It is said that the amount of heat

which it diffuses in the Atlantic Ocean in a winter's day would suffice to raise the temperature of the atmosphere of France and England from the freezing-point to summer's heat. The difference which exists betwixt our mild temperature and that of the opposite coast of the Atlantic ought, in a great degree, to be attributed to the influence of the Gulf Stream.*

The Gulf Stream at its departure has a rapidity of three to five miles an hour, varying according to the season. Its breadth is no more than some miles, and its temperature 83° Fahr. Thence it follows the coasts of America to about 34° of latitude, preserving a temperature of 76° Fahr. It then leaves the coast near Cape Clear, directing itself to the Azores, and spreads like a vast river in the basin of the Atlantic, between the coasts of America and Spain, where it forms with the sargasso or gulf-weed an immense whirlpool. The principal current continues to run towards the west. It directs itself towards the British Isles at the 46th parallel to the 40th west longitude, where its force loses much of its power by the division of its waters. The bulk of the water continues to follow the same direction, and its presence on the western coast is indicated by the lukewarm vapours and the soft winds of the south-west, and by the tropical plants landed on the west coast of Ireland, of the Hebrides, and even of Norway. It is not doubted that on the coasts of Norway, and even of Scotland and the Hebrides, the effects of the heat are such that ice never shows itself in their harbours. The climate is there mild

* Dr. Scorseby-Jackson's 'Climatology.'

all the year in the neighbourhood of Cape Nord, while on the opposite side of the Atlantic ice touches the coasts at a latitude much less elevated even than that of Newfoundland.

It is very important to notice here a principle named *ozone* remarked frequently in the atmosphere under certain circumstances. It is believed to possess great influence on the health of man. Whatever may be the chemical or philosophical explanation that can be given of ozone, the effect known at present teaches us that it is found on the sea or near to the sea, and the winds which blow on the land coming from the sea bring it in great abundance. It can be proved, by many experiments, that the sea at a short distance from the land possesses the largest amount of ozone; as to the lands and the coasts against which the ocean winds blow, they have much more ozone than in the valleys or in other places distant from the sea. *In general there is very little ozone near to towns and in the interior of the country.**

This principle is regarded as one of the most active forms of oxygen gas obtained by the action of the electric fluid, with which it has a great affinity. It has been demonstrated that it exists in a *free state* in the atmosphere, especially after a thunder-storm, or still more in the neighbourhood of a large electrical machine when in action. Ozone is in a high degree a gas which has an odour, and possesses a remarkable power of oxidation, and has antiseptic and disinfecting properties capable of

* Admiral Fitzroy's 'Weather-book.'

purifying the atmosphere from injurious miasmata. Nevertheless, unless it is well diluted with atmospheric air, it would be fatal to animal life to breathe it. It irritates the mucous membrane of the air-passages. Many hopes have been entertained of beneficial effects from this atmospheric element in epidemics. There is no doubt that during calm weather epidemics increase in intensity, while ozone, in the same conditions of atmosphere, diminishes in quantity. When the winds blow the pestilence disappears, while the ozone increases. The quantity of ozone not being excessive in the atmosphere, this principle is simply a light stimulant, which gives a salutary activity to languid functional action. An excess, however, of ozone gives a dangerous impulsion to affections of the lungs and bronchi, which often takes place on the shores of the Mediterranean, where this principle is very abundant. Ozone is also capable of producing influenza.*

Persons unacquainted with the topography of Bearn, and who are in the habit of confounding the south-east and south-west of France under the general denomination of south, cannot conceive, *à priori*, how it is that the Circius, the Bise, the Mistral, and the east winds, which inflict such cruel ravages on certain parts of Provence and of Languedoc, do not extend their influence to Pau, which is in the same latitude. Yet a study of the countries where these different winds arise, and of their geographical direction, on the map of France, demonstrates clearly that it is physically impossible they should be felt at Pau. Thus,

* Dr. Scoresby-Jackson's 'Climatology.'

as regards the west-north-west wind—the *Circius* of the ancients, renowned during countless ages for its violence, taking its origin in the valley which separates the Pyrénées from the chain of Castres and St. Pons—moderated in the Haut Languedoc; it increases progressively as it advances in the Bas Languedoc and blows with extreme force at Narbonne, at Bazières, and Agdé, whence it goes ultimately to expend itself in the Mediterranean.

The north wind, or *Bise*, passes by the mountains of the Haut Loire, of the Lozère, and the Cevennes, and produces a most biting cold when the mountains are covered with snow. In the spring and summer it is dry and scorching and injurious to vegetation, and is then known by the name of the *Tramontana*.

The north-west wind, or *Mistral*, has nearly the same origin as the *Circius*; but as its direction is entirely opposite to that of Pau, and as it passes usually at a distance of 70 to 80 leagues from that town, it is easy to see how completely exempt it must be from this scourge.

The east winds and their varieties known in Provence and Languedoc under the names *Aoura Roussa*, *Marin*, *Marin Blanc*, &c., which are so disastrous in those countries, are scarcely felt at Pau.*

Most of the winds above described are the scourge during the months of March and April of the zone in which the south-eastern health stations are placed, and render it necessary for delicate persons to move westward.

* ‘*Essai sur Montpellier*,’ par E. Thomas.

In a treatise like the present it is proper to mention the presence of clouds in the atmosphere and their influence on climate. Clouds intercept a great part of the light and warmth of the sun, so much so that, all things being equal, a country, on an average, has a higher temperature when clouds are rare, and is under a greater electric influence, tending towards a *maximum* or *positive* state. The atmosphere of countries so circumstanced is exciting to nervous persons and to the circulation of the blood.

But in countries subject to south-west winds, and under a sky covered with clouds, rain falls in abundance, electrical phenomena are almost insensible or negative, and the conditions of a non-irritant and sedative air calm the nervous system and the circulation of the blood.

In the state of the atmosphere just defined, particularly in countries adjacent to the sea, as in the winter stations of Nice, Menton, Cannes, Hyères, Montpellier, Biarritz, we find all the conditions which produce ozone.

On the contrary, in the second category of atmospheres in countries at a distance from seas, surrounded by valleys, and in the comparative absence of wind and of free electricity, as at Pau and its surrounding zone in the south-west of France, we find present all the conditions necessary for interrupting the generation of ozone.

Those abstract descriptions of the meteorological conditions applicable to certain localities in the south-east and south-west of France fix, in a great degree,

the character of these climates in reference to health and disease. In the south-east the presence of strong winds, the abundance of free electricity and ozone, give exciting properties. In the south-west, on the contrary, the tranquil air, negative electricity, and the relative absence of ozone, produce an atmosphere calming and sedative.

After having almost accomplished the task delegated to us by the Scientific Congress, it remains for us now to make a short *résumé* of our ideas. We have taken the different temperaments of man as a base of operations in considering the influence which climate would have upon him in health and disease. The sanguine, choleric, phlegmatic, and melancholic temperaments are common to all the varieties of the human race in health and in disease. The derangements of these temperaments, *which constitute disease*, have distinct affinities with such temperaments, and according to their origin demand a system of treatment *en rapport* with the nature of the temperaments in which the diseases occur.

After having analysed the general principles of medical climatology in an abstract manner, we have applied the principles which we have eliminated specially to the climates of the south-east and south-west of France.

It now remains for us only, as to the question of temperaments, to indicate the climates which would suit them in health and the localities which might cure them when diseased.

The first effect of the climate of Pau on a stranger is sedative, in diminishing the energy of the nervous sys-

tem and in influencing, after a sojourn more or less prolonged, the circulation of the blood. After some short period of climatising these symptoms disappear. These are the qualities of climate favorable to sanguine and choleric temperaments, and to the diseases of these temperaments, such as inflammatory and nervous affections of different organs.

At Nice, and at other winter stations in the south-east of France, the character of their climates is entirely opposed to that of Pau, since their irritating atmosphere is always charged with electricity and ozone. The results on human organisation are totally different. Thus persons, not invalids, but of a nervo-sanguine temperament, are frequently obliged to have recourse to a non-stimulant regimen to lower by artificial means the force of their constitutions. They abstain from meat and wine, and make use of refreshing drinks. On the contrary, persons of a phlegmatic and lymphatic temperament, difficult to excite, and with a languid circulation, acknowledge the benefit derived from the climate. The nervous and muscular systems acquire a new energy. A feeling of *bien-être* displaces the *mal-aise* and even the principle of their sufferings, the inevitable result of a languishing condition of the animal functions.

Statistics show that the sedative climate, which bridles inordinate nervous and vascular action, is more favorable to the duration of life among the natives than is the exciting, in the proportion of one third against the latter.

From what has been written, it would be super-

fluous in a communication addressed to the medical profession to point out *in detail* the diseased conditions of the frame likely to be beneficially influenced by the non-irritating climate of Pau. It is necessary only to point out some general landmarks :

1st. As the liability to scrofulous and lymphatic diseases in children is more a predisposition than an hereditary *germ*, it may not be illogical to infer that a climate in which the native population is sparingly visited with those affections is one, if betimes resorted to, calculated to discourage the bias to their development. And this doctrine holds good with regard to liability to cerebral inflammation, real and false croup, spasmodic asthma, and inflammatory attacks in general. In verification of this the author states from his own knowledge that several years ago no British subject under the age of twelve years had died at Pau, during the then previous seven consecutive years, of hydrocephalus acutus, or any other malady.

2nd. The climate of Pau acts also beneficially in discouraging the generation of tuberculous matter in the blood, by diminishing irritation in the mesenteric glands and in the lacteal system, and consequently preventing its deposition in different organs of the body.

3rd. Also, in checking tuberculous deposits from coming to maturity, by diminishing the velocity of the pulse and consequent frequency of respiration and thus, in the lungs for instance, preventing inflammatory fluxion to tuberculous *foci*, which, as

foreign bodies, under circumstances which increase the circulation, are liable to take on a softening process.

4th. In all tendencies to disease depending on nervo-sanguineous and choleric temperaments, such as nervous headache, convulsive disorders in the same temperaments, and liability to periodic inflammatory action, and in all aberrations of secretion depending on too high a state of irritability of the secreting organ.

In short, the predispositions which are favorably influenced by the climate of Pau may be summed up in one general principle, viz., whenever they depend upon increased nervous and arterial action, permanently produced either by temperament or by some cause leading, if unchecked, to active disease.

The climates of the health-resorts in the south-east, viz., Nice, Cannes, St. Remo, Menton, and Montpellier, and in Biarritz of the south-west of France, the first on the Mediterranean, the second on the Bay of Biscay, from their exciting properties are indicated, *par excellence*—1. Where there is a general decline of irritability or of the powers of life, as evidenced in atonic dyspepsia and in the long train of symptoms which accompany it, and in broken-down constitutions from long residence in hot climates, where the functional energy of the liver has been reduced to a low ebb. 2. In the catarrh of old men and in chronic bronchitis, where there is a great reduction of tone and excess of expectoration. 3. In chronic rheumatism attended with a

debilitated state of the digestive system and complicated with atonic gout. 4. In all apoplectic tendencies depending upon passive congestion of any of the nobler organs in leuco-phlegmatic temperaments. 5. In chlorosis from absence of functional tone and accompanied with a congested state of the uterus. 6. In all diseases where there are congestion of the venous system and diminished nervous energy.

Why Montpellier should, for many years, have been the only foreign climate for English *poitrinaires* is inexplicable, except that, whereas their own climate was damp and cold, Montpellier was dry and hot. Another reason, perhaps, was that it was the seat of a famous medical school; but this latter advantage but badly compensated for a climate which was subject during the spring to irritating winds loaded with impalpable dust, exciting in their qualities and productive of inflammatory diseases of an acute character. To prove these latter assertions we produce the following unbiassed evidence. We find in a work on the medical topography of Montpellier* the following statistical results of diseases treated during a year in the public hospital of that town:—The number of patients admitted in one year was 2756; the proportion of deaths was 154, and of that number 53, that is, more than a third, were caused by diseases of the chest.

In conclusion, and to meet the mistaken assertion that the climate of Pau is relaxing, we insist, from stronger reasons than mere guess-work, that to pro-

* 'Topographie Médicale de la Ville de Montpellier,' par M. Murat.

duce a relaxing climate there must be two leading elements present—first, an elevated temperature, and second, the presence in the atmosphere of free communicable damp. These are not the characters of the Pau climate, since the mean of the highest temperature of eight months from October to May, the invalids' season, is 56° , that of Greenwich being 49° , and the *mean* moisture of the air at 9 o'clock a.m., for the same period (air saturated with moisture being 100), is for Pau 79, for Greenwich 89; in the middle of the day the mean moisture of the air is for Pau 65, for Greenwich 79.*



